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UNITED STATES  
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OFFICE OF INSPECTION AND ENFORCEMENT  
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## VACUUM CONDITION RESULTING IN DAMAGE TO CHEMICAL VOLUME CONTROL SYSTEM (CVCS) HOLDUP TANKS (SOMETIMES CALLED "CLEAN WASTE RECEIVER TANKS")

In July 1977, IE Circular No. 77-10 identified two instances which resulted in radioactive gaseous releases when tanks at Trojan and Rancho Seco buckled due to partial vacuum conditions. The Circular "recommended that you examine the systems of your reactor facility(ies) that contain low pressure process or holdup tanks and assure that adequate measures have been taken to protect against vacuum conditions that could result in tank inward buckling and failure with subsequent release of radioactive material or cause other detrimental effects with regard to overall safety of plant operations." Despite issuance of the Circular, similar events have subsequently occurred at Turkey Point 3 (LER's 78-17, 79-8, and 79-25) and Salem 1 (LER's 79-67 and 79-76).

The accident at TMI has re-emphasized the importance of protecting against unexpected radioactive release paths during abnormal conditions. The CVCS Holdup Tanks (HUT) represent such a path since normal letdown flow is directed into the CVCS which could add radioactive water to the HUT during abnormal conditions if fuel failures are present. It is also possible for the same "abnormal conditions" to cause HUT damage, since there is a greater probability of operational errors resulting from the combination of manual and automatic maneuvers made to respond to the abnormal condition. These errors could cause a partial vacuum to be drawn in the HUT, causing tank rupture and a release path that bypasses the normally present reactor vessel and containment barriers to such releases.

We note that both Turkey Point and Salem have elected to install vacuum breakers in their CVCS-HUTS. As specified by the required Actions below, you should consider installing vacuum protection in your plants, appropriately designed to preclude collapse of the tanks. Any proposed or already installed vacuum protection system must consider the necessity for precluding adverse effects due to operation or misoperation of the system (for example, creation of an explosive gas mixture if hydrogen gas is present in the HUT). Any proposed or already installed system must also include consideration of the following: (a) tanks with a cover gas must be able to admit the cover gas fast enough to keep up with the maximum rate of liquid removal from the tank; (b) vacuum relief valves must be covered by an acceptable surveillance program; (c) tanks that are located outside must have adequate freeze protection for the tank and for the vacuum relief system.

Actions to be taken by all PWR licensees and permit holders:

1. Review the design of all systems that contain low pressure or holdup tanks that can be valved to contain primary system water. Assure that adequate

measures have been taken to protect against vacuum conditions that could result in tank damage with the potential for release of radioactive material or detrimental effects with regard to overall safety of plant operations.

2. Provide a listing of those systems reviewed in Item 1. Describe any measures that already exist for those systems to protect against vacuum conditions, and either: (1) explain why those measures are adequate in light of the events referenced above, or (2) identify corrective actions taken or planned to provide acceptable protection, and provide a schedule for any planned corrective actions.

Licensees of all operating power reactor facilities shall submit the information requested within 90 days of the date of this letter. Include in your response to this Bulletin, (a) your schedule for correcting these items, (b) if reactor operation is to continue prior to correcting identified deficiencies, include your justification for continued operation. Licensees with a construction permit shall also submit the design information requested within 90 days of the date of this letter.

Reports shall be submitted to the Director of the appropriate NRC Regional Office and a copy forwarded to the Director, NRC Office of Inspection and Enforcement, Washington, D.C. 20555.

Approved by GAO, B180225 (R0072): clearance expires 7-31-80. Approval was given under a blanket clearance specifically for identified generic problems.

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